

REMARKS

The Office Action of June 19, 2007 has been received and carefully reviewed. It is submitted that, by this Amendment, all bases of rejection are traversed and overcome. Upon entry of this Amendment, claims 24-33, 35-41, 49 and 50 remain in the application. Reconsideration of the claims is respectfully requested.

Claims 24-33, 35-41 and 50 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Examiner states that the addition of the substrate as being part of the fuel cell is not supported by the specification.

Applicants respectfully disagree with the Examiner's conclusion that the addition of the substrate as being part of the fuel cell is not supported by the specification as filed. Applicants' specification, viewed in its entirety, is directed to methods of forming a metal oxide film that may be used as an electrode or an electrolyte in a fuel cell. Embodiments of the method generally include forming the metal oxide film 10 on a substrate 12 (see Fig. 1, provided hereinbelow, and the corresponding text of Applicants' specification). In an example, the metal oxide film 10 formed on the substrate 12 has a thickness F ranging from about 0.05 microns to about 20 microns (see page 8, lines 3-15). Applicants' specification does not disclose that the metal oxide film 10 is removed from the substrate 12.

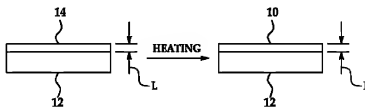


FIG. 1

It is submitted that one skilled in the art would recognize that the substrate 12 supports the thin film 10, thereby contributing to and maintaining the robustness and integrity of the metal oxide film 10.

Furthermore, one skilled in the art would be cognizant of the fact that the substrate is included in the fuel cell because the substrate material is not removed, and is selected such that the fuel cell functions properly. One skilled in the art would recognize (both in view of the specification as filed and the general knowledge in the art) that when the metal oxide film 10 forms the anode or cathode and the substrate 12 remains in the fuel cell stack, such as in Applicants' claims 24 and 50, the substrate material should be substantially porous to allow the passage of reactants and oxidants to the anode and cathode, respectively. One skilled in the art would also recognize (both in view of the specification as filed and the general knowledge in the art) that when the metal oxide film 10 forms the electrolyte and the substrate 12 remains in the fuel cell stack, the substrate material should be dense, yet capable of allowing the transport of positively charged hydrogen ions (protons) from the anode to the cathode. A plurality of substrate materials are provided in Applicants' specification as filed, at least a page 6, lines 26-29, examples of which include single crystal silicon, polycrystalline silicon, silicon oxide containing dielectric substrates, alumina, sapphire, etc. One skilled in the art would be cognizant of the fact that the desirable material may be selected such that it is porous or dense, depending on the desirable location and use within the fuel cell.

In view of the general knowledge of the skilled artisan and the specification as a whole, Applicants submit that claims 24-33, 35-41 and 50 do comply with the written description requirement. As such, Applicants assert that the rejection based upon 35 U.S.C. § 112, first paragraph, is erroneously based, and withdrawal of the same is respectfully requested.

Claims 24-33, 35-41 and 50 also stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. The Examiner states that it is unclear whether the substrate is part of the fuel cell or the substrate is removed so that only the metal oxide film is part of the fuel cell.

The Examiner also asserts that it is unclear whether the substrate that has the deposited third solution is the same as the substrate with the metal oxide film.

Regarding the Examiner's first assertion under 35 U.S.C. § 112, second paragraph, Applicants reiterate the arguments provided above in regard to the rejection under § 112, first paragraph. As such, Applicants submit that the specification and claims clearly set forth that the substrate is part of the fuel cell.

Regarding the Examiner's second assertion under 35 U.S.C. § 112, second paragraph, claims 24 and 50 have been amended such that the recitation "a" substrate in line 12 of claim 24 and in line 11 of claim 50 now recites "the" substrate.

For all the reasons provided hereinabove, Applicants submit that the rejection under 35 U.S.C. § 112, second paragraph, is erroneously based and/or has been traversed and overcome, and withdrawal of the same is respectfully requested.

Claims 24-33, 35-37, 49 and 50 stand rejected under 35 U.S.C. § 102(e) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Hata, et al. (U.S. Patent No. 6,902,790). The Examiner states that Hata discloses all of the elements of Applicants' independent claims 24, 49 and 50, but admits that the fuel cell disclosed in Hata does *not* include **a substrate**.

Applicants' claim 49 has been amended to also recite **a substrate** in the fuel cell, where the metal oxide is established on the substrate.

Applicants submit that independent claims 24, 49 and 50 are not anticipated by or rendered obvious in view of Hata because the claims include **a substrate** in the fuel cell, which is admittedly not disclosed in Hata. Hata discloses that the ceramic sheet may be used as a solid-electrolyte film or electrode sheet of a solid oxide fuel cell (SOFC). Hata's ceramic sheet has a thickness ranging from 10 to 500 μm , and more preferably from 50 to 300 μm , "to minimize electrical resistance while satisfying required **strength**" (emphasis added, see column 12, lines 49-53). In another example, Hata discloses that the ceramic sheet may be molded into a

thin film sheet having a thickness of about 0.01 to about 0.5 mm. (See column 17, lines 32-36). Since Hata discloses that the ceramic sheet has the required strength, it is submitted that one skilled in the art would not be led to form the sheet on a substrate. The examples provided in Hata are in sharp contrast to Applicants' claims 24, 49 and 50, where (as provided above) a metal oxide film is established on a substrate and is included in the fuel cell. As previously described, Applicants' metal oxide film is relatively thin and the substrate adds integrity and robustness (i.e., strength) to the metal oxide film.

For all of the reasons provided above, it is submitted that the invention as defined in Applicants' independent claims 24, 49 and 50, as well as in the claims depending ultimately therefrom, is not anticipated, taught, or rendered obvious by Hata, either alone or in combination, and patentably defines over the art of record.

Claim 38 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Hata in view of Borglum, et al. (U.S. Patent No. 6,139,985). The Examiner states that Hata does not disclose that the metal oxide film has a thickness ranging between about 0.05 μm to about 5 μm , but that Borglum does disclose such a thickness. The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Hata fuel cell to include a metal oxide film having a thickness ranging between about 0.05 μm to about 5 μm in order to prevent problems due to mismatch of thermal expansion of the different components of the fuel cell.

In response thereto, Applicants submit that Hata fails to establish all elements (i.e., the substrate) of Applicants' independent claim 24, from which claim 38 directly depends, and that Borglum fails to supply this deficiency. More particularly, Borglum teaches that the air electrode is a porous, doped lanthanum manganite (see column 4, lines 12-13), that the electrolyte is an oxide having a fluorite structure or a mixed oxide in the perovskite family, with the preferred example being a stabilized zirconia based ceramic (see column 4, lines 17-22),

that the fuel electrode is a cermet (see column 4, line 23), and that a cerium oxide interlayer is present between the air or fuel electrode and the electrolyte.

For all the reasons stated above, it is therefore submitted that Applicants' invention as defined in independent claim 38 is not anticipated, taught or rendered obvious by Hata and Borglum, either alone or in combination, and patentably defines over the art of record.

Claims 39-41 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hata in view of Ishihara, et al. (U.S. Patent No. 5,175,063). The Examiner states that Hata does not disclose an electronic device including a load and the fuel cell of claim 24 connected to the load, but that Ishihara does disclose a fuel cell connected to a load. The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Hata fuel cell to include a load connected thereto in order to efficiently utilize the power generated by the fuel cell in a practical application.

As previously described, Hata fails to establish all elements of Applicants' claim 24. As such, Applicants submit that Hata also fails to establish the limitations of "the fuel cell of claim 24" as recited in Applicants' independent claims 39 and 40. It is further submitted that Ishihara fails to supply the deficiency of Hata with respect to claims 39 and 40.

As such, Applicants submit that the invention as defined in Applicants' claims 39 and 40, and in the claims depending ultimately therefrom, is not anticipated, taught, or rendered obvious by Hata and Ishihara, either alone or in combination, and patentably defines over the art of record.

In summary, claims 24-33, 35-41, 49 and 50 remain in the application. It is submitted that, through this Amendment, Applicants' invention as set forth in these claims is now in a condition suitable for allowance.

Further and favorable consideration is requested. If the Examiner believes it would expedite prosecution of the above-identified application, the Examiner is cordially invited to contact Applicants' Attorney at the below-listed telephone number.

Respectfully submitted,

DIERKER & ASSOCIATES, P.C.

/Julia Church Dierker/

Julia Church Dierker
Attorney for Applicants
Registration No. 33368
(248) 649-9900, ext. 25
juliad@troypatent.com

3331 West Big Beaver Rd., Suite 109
Troy, Michigan 48084-2813
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JCD/AMS/JRK